Trend Study 25C-25-03

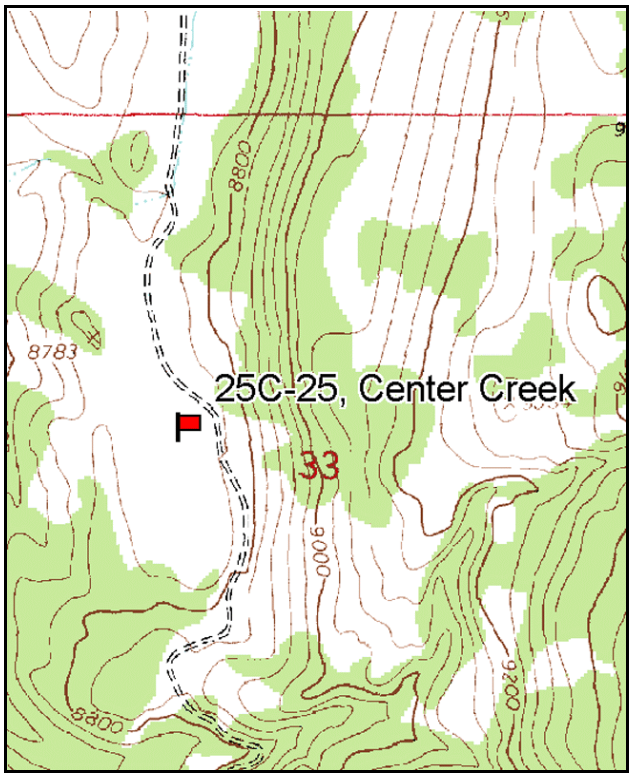
Study site name: Center Creek . Vegetation type: Burn .

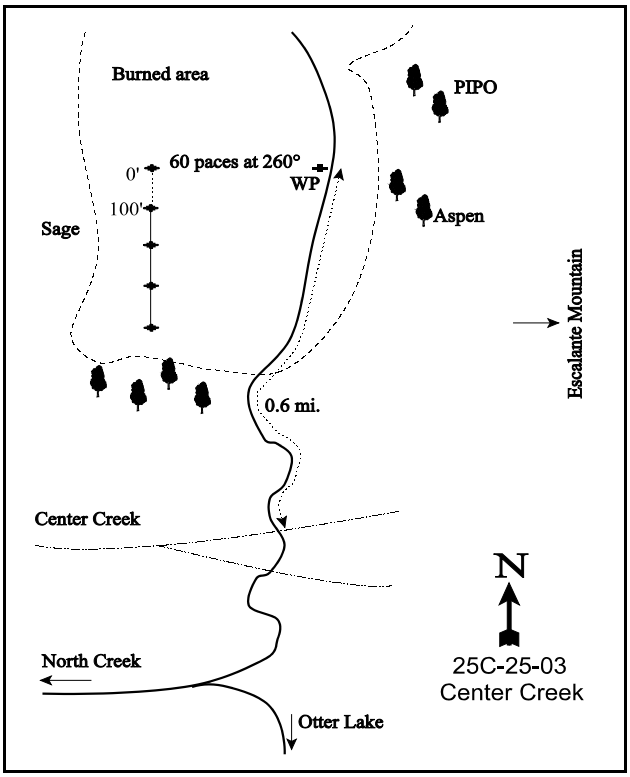
Compass bearing: frequency baseline 183 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line4 (71ft).

LOCATION DESCRIPTION

From the intersection of SR12 and Rt. 1660 (to 22) turn left onto Johns Flat Road. Go 17.2 miles to the Grass Lake Road (USFS sign) and turn east. Travel 1.2 miles on this road to a fork by some fields. Turn right and continue 0.4 miles to the Horse Creek Fork. Turn left and go 1.15 miles to a fork with a sign. Stay left and continue 0.25 miles on the main road. Past the buildings, at Birch Creek, take the right fork and go 0.6 miles. Stay left at the fork and go 0.75 miles to a cattleguard. Continue 0.75 miles to a fork. Stay left and go 1.65 miles to a USFS exclosure. Continue 2.55 miles to a cattleguard. Continue 0.5 miles to North Creek. Go 2.6 miles, past the North Creek transect, to the Center Creek-Otter Lake intersection. Bear left and go 1.25 miles to a witness post on the left side of the road. Walk 60 paces west to the 0-foot baseline stake, a short fencepost marked with a red browse tag.





Map Name: Grass Lakes

Diagrammatic Sketch

Township 32S , Range 1W , Section 33

GPS: NAD 27, UTM 12S 4203857 N, 420338 E

DISCUSSION

Center Creek - Trend Study No. 25C-25

This range trend study is located on a sagebrush flat north and east of Center Creek that was burned as part of a 1984 treatment. It is now occupied by rabbitbrush and herbaceous vegetation. The old sagebrush flat is on a high bench on the west side of the Escalante Mountains (Aquarius Plateau). Terrain in the small valley is relatively flat with a slight southwest aspect. Elevation at the site is 8,750 feet. Deer often utilize high elevation winter ranges on the west side of herd unit between Widtsoe and Antimony during light to moderate winters. There was fairly abundant deer and elk use at 15 deer and elk days use/acre (37 days use/ha) on the site in 1991, with apparently more use made of the surrounding sagebrush hillsides and aspen stands. Pellet group data from 1998 estimated 36 deer, 12 elk, and 33 cow days use/acre (89 ddu/ha, 30 edu/ha, and 82 cdu/ha). Cattle pats appeared to be from the previous year, while most of the elk pellet groups appeared to be from the past 6 months. Deer sign was more recent with about half within a few weeks of age. Pellet group data from 2003 shows similar use at 25 deer, 12 elk, and 27 cow days use/acre (61 ddu/ha, 30 edu/ha, and 66 cdu/ha). Most of the elk and deer pellet groups sampled in 2003 appeared to be from spring use. Cattle use appeared to be from the current year in 2003. There are a considerable amount of ant hills on the site.

Soil on the site is moderately deep with an effective rooting depth of almost 18 inches. Texture is a loam which is slightly acidic in reaction (pH 6.1). Pavement is common on the surface with a cover value of 33% in 1998. There is excellent protective ground cover and little exposed bare ground. Current erosion is minimal due to good soil protection and gentle terrain.

Mountain big sagebrush has reestablish itself since the 1984 burn. It had a density of 200 plants/acre in 1987, 1,380 in 1991, and 2,620 by 2003. Utilization has remained light to moderate through the years with good vigor and low percent decadence. Reproduction remains good.

The dominant shrub is mountain low rabbitbrush which provided 83% of the browse cover in 1998 and 63% in 2003. Density was estimated at almost 4,000 plants/acre in 1987. Ninety-eight percent of those medium-sized shrubs encountered were mature vigorously prolific plants. This population exploded in 1991, increasing it's density nearly 9 times to 35,066 plants/acre, 84% of which were classified as young. Competition and drought have since thinned the high density to 25,360 plants/acre in 1994 and 12,360 plants/acre in 1998. Density increased 32% in 2003 to 18,080 plants/acre. Twenty-one percent of the population consists of young plants. Mature plants are smaller than those sampled in 1998 with an average height of 12 inches compared to 20 inches in 1998. The population appears relatively stable but overly abundant. Utilization of these shrubs is mostly light. There is also some horsebrush, rubber rabbitbrush, and snowberry plants on the site, however at this elevation, it is really the herbaceous vegetation that is important and the woody plants appear to be unutilized.

There is a good mix and diversity of grasses and forbs, but grasses dominate the understory. Average cover of perennial grasses was estimated at 19% in 1994 and 24% by 1998. The most common grasses are the native pinewoods needlegrass and mutton bluegrass, and the seeded grasses, crested wheatgrass and smooth brome. Forbs are diverse, but only a few species are abundant. The large silky lupine is the dominant forb along with redroot eriogonum and Utah deervetch which combined to produce 81% of the forb cover in 1998 and 68% in 2003. Utilization of these plants appears light.

1987 APPARENT TREND ASSESSMENT

Protective ground cover is excellent and erosion is not a problem on this site. Preferred browse are lacking and the shrub composition is dominated by mountain low rabbitbrush. Mountain big sagebrush has a low density of 200 plants/acre, all of which are young. The sagebrush population should increase in time. The herbaceous understory contains a good mix of grasses and forbs. Several seeded grasses have established in good numbers.

1991 TREND ASSESSMENT

The soil trend appears to be stable since percent bare ground has remained at around 10% cover since 1987. The most common browse, low rabbitbrush, has increased dramatically while the key species, mountain big sagebrush, has also increased from 200 to 733 plants/acre. Seedlings and young are moderately abundant and the population should continue to expand. Trend for browse is improving, but still poor because of the overwhelming numbers of the increaser shrub, mountain low rabbitbrush, which was brought on by the fire. The most important aspect of this site is the herbaceous understory. There are 40 species of grasses and forbs sampled on this site. The inspection of the sum of nested frequencies for the grasses and forbs shows that grasses increased, while the forbs declined slightly. The overall trend is considered up slightly.

TREND ASSESSMENT
soil - stable (3)
browse - up slightly (4)
herbaceous understory - up slightly (4)

1994 TREND ASSESSMENT

Basic ground cover characteristics have improved in some areas but declined in others. Average cover of pavement declined 42% but litter cover also declined. Cover of bare ground has remained low. Trend for soil is considered stable. The browse component is still dominated by mountain low rabbitbrush. However, it's density has declined considerably since 1991, while the population density of the preferred mountain big sagebrush increased by 47%. The browse composition is still poor, but slowly improving. The herbaceous trend is down due to a major decline in the sum of nested frequencies for both grasses and forbs. Some of this decline may be the result of the natural thinning process after a fire. The extremely dry spring and summer of 1994 is also an additional cause for these declines.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - down (1)

1998 TREND ASSESSMENT

Trend for soil is up slightly due to a slight decline in percent bare ground combined with an increase in litter and vegetation cover. Trend for browse is up. Density of mountain big sagebrush increased slightly, while the number of mountain low rabbitbrush declined 51%. Utilization of the sagebrush remains light, vigor good, and percent decadence low at only 1%. Dead plants counted in 1998 were burned stems from the 1984 fire. Age class analysis suggests that the sagebrush population will probably continue to increase slowly. Mountain low rabbitbrush declined in density, but there are still an estimated 12,360 plants/acre, 48% of which are young plants. Seedlings are also abundant. The decline in density came from the young age class which numbered 19,620 plants/acre in 1994. Mature plant density actually rose from 4,500 to 6,060 plants/acre since 1994. The population will likely become more mature in the future, although density will probably not drop significantly any time soon. Trend for the herbaceous understory is up slightly compared to 1994 data. Sum of nested frequency of perennial grasses and forbs increased. Production is also improved since 1994, especially for forbs. Cover of grasses has increased from 20% to 24% while forb cover has gone from 3% to 12%.

TREND ASSESSMENT
soil - up slightly (4)
browse - up (5)
herbaceous understory - up slightly (4)

2003 TREND ASSESSMENT

Trend for soil is stable. There is abundant protective ground cover and very little exposed bare ground. Trend for the key browse species, mountain big sagebrush is up. Density has increased 46% and average cover rose from 1.5% in 1998 to 7.4% in 2003. Use remains light to moderate, vigor good, and decadence low. No seedlings were encountered in 2003, but young plants account for 16% of the population. The site is still dominated by mountain low rabbitbrush which provided 63% of the total browse cover in 2003. Density of rabbitbrush increased 32% to 18,080 plants/acre and 21% of the population was classified as young. These shrubs are mostly unutilized. Trend for the herbaceous understory is mixed. Sum of nested frequency for grasses declined 13% with a significant drop in the nested frequency of intermediate wheatgrass, bluebunch wheatgrass, and bottlebrush squirreltail. Dominant grasses, pinewoods needlegrass, crested wheatgrass, smooth brome, and mutton bluegrass remained relatively stable. Perennial forb sum of nested frequency declined 38% with significant declines in dominant forbs, Utah deervetch, silky lupine, and dandelion. Since grasses provide the bulk of the herbaceous cover, overall trend for the herbaceous understory is considered down slightly.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Management unit 25C, Study no: 25

Type	Species	Nested Frequency					Average Cover %		
		'87	'91	'94	'98	'03	'94	'98	'03
G	Agropyron cristatum	$_{a}$110	$_{b}$148	$_{ab}$131	$_{b}$165	$_{ab}$126	3.22	5.21	2.17
G	Agropyron intermedium	$_{ab}$19	$_{ab}$11	$_{a}$5	$_{b}$25	$_{a}$5	.03	.29	.06
G	Agropyron spicatum	$_{ab}$4	$_{ab}$3	$_{ab}$4	$_{b}$12	$_{a}$-	.03	.24	-
G	Bouteloua gracilis	$_{ab}$26	$_{ab}$27	$_{ab}$26	$_{a}$15	$_{b}$44	1.58	.48	1.41
G	Bromus inermis	$_{a}$58	$_{b}$124	$_{b}$124	$_{c}$176	$_{c}$211	2.25	6.44	5.12
G	Bromus japonicus (a)	6	-	-	1	-	-	.03	-
G	Carex spp.	8	3	2	4	2	.03	.03	.00
G	Festuca ovina	-	1	5	7	-	.03	.09	-
G	Koeleria cristata	-	-	-	-	-	-	.03	-
G	Poa fendleriana	$_{b}$49	$_{ab}$62	$_{a}$18	$_{c}$127	$_{c}$103	.43	3.45	3.48
G	Poa pratensis	-	-	3	3	6	.15	.38	.30
G	Poa secunda	-	-	-	1	8	-	.03	.06
G	Sitanion hystrix	$_{b}$126	$_{c}$200	$_{a}$83	$_{b}$136	$_{a}$68	.56	3.11	1.02
G	Stipa comata	$_{a}$-	$_{c}$54	$_{a}$-	$_{b}$27	$_{b}$24	-	.38	.37
G	Stipa pinetorum	$_{a}$171	$_{c}$198	$_{d}$272	$_{bc}$166	$_{b}$152	11.32	4.17	2.74
Total for Annual Grasses		6	0	0	1	0	0	0.03	0
Total for Perennial Grasses		571	831	673	864	749	19.66	24.35	16.77
Total for Grasses		577	831	673	865	749	19.66	24.38	16.77

Type	Species	Nested Frequency					Average Cover %		
		'87	'91	'94	'98	'03	'94	'98	'03
F	Agoseris glauca	-	4	-	3	1	-	.01	.03
F	Alyssum alyssoides (a)	-	-	-	1	-	-	.00	-
F	Antennaria parvifolia	-	1	4	7	-	.03	.33	-
F	Antennaria rosea	-	-	-	-	4	-	-	.07
F	Androsace septentrionalis (a)	$_{a}$14	$_{a}$5	$_{a}$20	$_{b}$73	$_{a}$4	.07	.35	.01
F	Arabis spp.	-	-	-	3	2	-	.00	.00
F	Astragalus convallarius	$_{a}$-	$_{ab}$4	$_{ab}$6	$_{b}$15	$_{a}$-	.01	.22	-
F	Astragalus spp.	-	-	-	1	-	-	.03	-
F	Castilleja linariaefolia	$_{a}$-	$_{a}$-	$_{a}$2	$_{b}$12	$_{ab}$7	.00	.10	.33
F	Calochortus nuttallii	-	-	3	-	3	.00	-	.00
F	Chenopodium album (a)	-	-	5	3	3	.01	.03	.15
F	Chaenactis douglasii	$_{b}$37	$_{c}$46	$_{b}$22	$_{b}$19	$_{a}$-	.05	.09	-
F	Chenopodium leptophyllum(a)	-	-	-	-	4	-	-	.01
F	Collomia linearis (a)	-	-	-	2	-	-	.00	-
F	Crepis acuminata	-	-	-	4	-	-	.01	-
F	Cruciferae	4	6	-	-	-	-	-	-
F	Descurainia pinnata (a)	$_{b}$17	$_{b}$22	$_{a}$-	$_{a}$3	$_{a}$3	-	.00	.00
F	Dracocephalum parviflorum	2	-	-	-	2	-	-	.00
F	Eriogonum cernuum (a)	-	2	-	2	-	-	.01	-
F	Erodium cicutarium (a)	-	-	1	-	-	.00	-	-
F	Erigeron eatonii	$_{a}$-	$_{b}$16	$_{a}$-	$_{b}$27	$_{b}$15	-	.15	.08
F	Erigeron flagellaris	-	8	-	9	-	-	.05	-
F	Eriogonum hookeri (a)	$_{b}$12	$_{b}$9	$_{b}$20	$_{a}$-	$_{a}$-	.09	-	-
F	Erigeron pumilus	$_{ab}$13	$_{b}$33	$_{b}$36	$_{a}$8	$_{b}$29	.26	.09	.39
F	Eriogonum racemosum	$_{a}$63	$_{ab}$79	$_{ab}$87	$_{b}$109	$_{b}$106	.77	2.04	1.76
F	Eriogonum umbellatum	-	-	-	-	6	-	-	.01
F	Holosteum umbellatum (a)	-	-	-	1	-	-	.00	-
F	Hymenoxys richardsonii	-	3	-	-	-	-	-	-
F	Ipomopsis aggregata	-	4	6	5	-	.01	.18	-
F	Lappula occidentalis (a)	3	5	-	2	5	-	.00	.01
F	Lotus utahensis	$_{d}$188	$_{c}$136	$_{b}$98	$_{bc}$108	$_{a}$41	.40	2.66	.36
F	Lupinus sericeus	$_{c}$132	$_{b}$59	$_{ab}$32	$_{b}$54	$_{a}$18	1.29	5.44	2.32
F	Lychnis drummondii	$_{a}$1	$_{b}$22	$_{a}$-	$_{a}$-	$_{a}$1	-	-	.00
F	Machaeranthera canescens	$_{a}$-	$_{ab}$3	$_{ab}$4	$_{ab}$2	$_{b}$13	.03	.03	.19
F	Microsteris gracilis (a)	-	-	-	-	2	-	-	.01
F	Penstemon comarrhenus	$_{a}$12	$_{a}$9	$_{ab}$17	$_{a}$5	$_{b}$28	.09	.01	.48
F	Phlox longifolia	$_{d}$198	$_{c}$79	$_{b}$34	$_{a}$5	$_{a}$2	.08	.03	.01

Type	Species	Nested Frequency					Average Cover %		
		'87	'91	'94	'98	'03	'94	'98	'03
F	Potentilla biennis	1	-	-	-	-	-	.00	-
F	Potentilla concinna	-	-	-	-	1	-	-	.00
F	Polygonum douglasii (a)	-	-	6	-	3	.01	-	.00
F	Senecio multilobatus	$_{a}$8	$_{b}$34	$_{ab}$22	$_{a}$2	$_{a}$7	.05	.01	.04
F	Taraxacum officinale	$_{d}$209	$_{d}$187	$_{b}$38	$_{c}$74	$_{a}$3	.07	.41	.15
F	Tragopogon dubius	6	6	-	7	8	-	.01	.02
Total for Annual Forbs		46	43	52	87	24	0.19	0.41	0.20
Total for Perennial Forbs		874	739	411	479	297	3.20	11.98	6.33
Total for Forbs		920	782	463	566	321	3.39	12.39	6.53

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 25C, Study no: 25

Type	Species	Strip Frequency			Average Cover %		
		'94	'98	'03	'94	'98	'03
B	Artemisia tridentata vaseyana	34	37	56	1.42	1.50	7.36
B	Chrysothamnus nauseosus	17	7	14	.33	-	.24
B	Chrysothamnus viscidiflorus lanceolatus	96	100	97	14.60	14.51	13.74
B	Symphoricarpos oreophilus	2	3	2	.41	.76	.15
B	Tetradymia canescens	22	15	13	1.01	.69	.18
Total for Browse		171	162	182	17.79	17.47	21.68

CANOPY COVER, LINE INTERCEPT --
Management unit 25C, Study no: 25

Species	Percent Cover '03
Artemisia tridentata vaseyana	12.33
Chrysothamnus nauseosus	.81
Chrysothamnus viscidiflorus lanceolatus	17.60
Symphoricarpos oreophilus	.15
Tetradymia canescens	.61

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 25C, Study no: 25

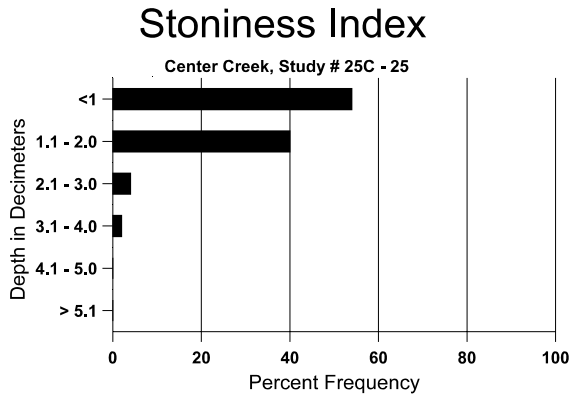
Species	Average leader growth (in) '03
Artemisia tridentata vaseyana	2.2

BASIC COVER --
Management unit 25C, Study no: 25

Cover Type	Average Cover % '87	'91	'94	'98	'03
Vegetation	18.25	11.25	36.82	54.06	43.32
Rock	.50	.75	1.92	.29	1.07
Pavement	41.50	42.00	24.34	32.76	44.06
Litter	30.25	35.75	29.96	41.45	20.54
Cryptogams	0	0	0	.01	.04
Bare Ground	9.50	10.25	8.61	4.53	3.86

SOIL ANALYSIS DATA --
Management unit 25C, Study no: 25, Study Name: Center Creek

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
17.9	55.0 (13.5)	6.1	48.4	31.1	20.6	2.7	15.3	249.6	0.4



PELLET GROUP DATA --
Management unit 25C, Study no: 25

Type	Quadrat Frequency '94	'98	'03
Rabbit	12	14	12
Elk	12	5	6
Deer	29	25	8
Cattle	1	8	17

Days use per acre (ha) '98	'03
-	-
6 (15)	12 (30)
36 (89)	25 (61)
33 (82)	27 (66)

BROWSE CHARACTERISTICS --
Management unit 25C, Study no: 25

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia tridentata vaseyana											
87	**200**	66	200	-	-	-	0	0	0	0	-/-
91	**733**	200	533	200	-	-	27	0	0	0	10/12
94	**1380**	540	240	1100	40	400	9	0	3	0	33/45
98	**1420**	240	460	940	20	640	13	0	1	0	19/29
03	**2620**	-	420	2100	100	-	11	0	4	.76	18/27
Chrysothamnus nauseosus											
87	**66**	-	-	66	-	-	0	0	0	0	26/26
91	**333**	-	200	133	-	-	0	0	0	0	34/35
94	**740**	20	300	400	40	-	8	0	5	3	50/47
98	**180**	-	40	120	20	-	0	0	11	11	30/22
03	**340**	-	20	260	60	-	24	0	18	0	29/26
Chrysothamnus viscidiflorus lanceolatus											
87	**3999**	-	66	3933	-	-	0	0	0	0	19/23
91	**35066**	34866	29666	5400	-	-	.57	0	0	2	23/30
94	**25460**	480	19620	4500	1340	40	.23	1	5	.31	49/55
98	**12360**	860	5980	6060	320	60	.32	.97	3	5	20/24
03	**18080**	20	3860	13620	600	-	1	0	3	.33	12/15
Leptodactylon pungens											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
94	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	15/17
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Symphoricarpos oreophilus											
87	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
94	**60**	-	20	40	-	-	0	0	-	0	17/43
98	**60**	-	20	40	-	-	0	0	-	0	22/74
03	**40**	-	20	20	-	-	0	0	-	0	22/70
Tetradymia canescens											
87	**533**	-	200	333	-	-	0	0	0	0	11/11
91	**533**	-	333	200	-	-	13	0	0	0	13/17
94	**640**	-	180	440	20	-	6	6	3	0	34/41
98	**400**	-	20	320	60	-	20	0	15	5	16/22
03	**340**	-	-	240	100	-	0	0	29	12	11/15